4.1   OBJECT ORIENTED PROGRAMMING USING C++
(Common with Computer Engineering)

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3   -   6
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RATIONALE

Object orientation is a new approach to understand the complexities of the real world.   In contrast to the earlier approaches like procedural etc, object orientation helps to formulate the problems in a better way giving high reliability, adaptability and extensibility to the applications. The students are already familiar with this concept of programming in C which is the basic for C++. This course offers the modern programming language C++ that shall help the students to implement the various concept of object orientation practically. The students will be able to programme in the object oriented technology with the usage of C++.

DETAILED CONTENTS

1.   Introduction and Features   (5 hrs)

    1.1   Fundamentals of object oriented programming – procedure oriented programming Vs. object oriented programming (OOP)

    1.2   Object oriented programming concepts – Classes, reusability, encapsulation, inheritance, polymorphism, dynamic binding, message passing

2.   Language Constructs   (13 hrs)

Review of constructs of C used in C++ : variables, types and type declarations, user defined data types; increment and decrement operators, relational and logical operators; if then else clause; conditional expressions, input and output statement, loops, switch case, arrays, structure, unions, functions, pointers; preprocessor directives

3.   Classes and Objects   (6 Hrs)

    3.1   Creation, accessing class members
    3.2   Private Vs Public
    3.3   Constructor and Destructor
    3.4   Objects

4.   Member Functions   (4 Hrs)

    4.1   Method definition
    4.2   Inline Implementation
    4.3   Constant member functions

5.   Overloading Member Functions   (4 hrs)
Need of operator overloading, prefix and postfix, overloading binary operators, operator overloading, instream/outstream operator overloading

6.   Inheritance   (6 hrs)

Definition of inheritance, protected data, private data, public data, inheriting constructors and destructors, constructor for virtual base classes, constructors and destructors of derived classes, and virtual functions, size of a derived class, order of invocation, types of inheritance, single inheritance, hierarchical inheritance, multiple inheritance, hybrid inheritance

7.   Polymorphism and Virtual Functions   (5 hrs)

Importance of virtual function, function call binding, virtual functions, implementing late binding, need for virtual functions, abstract base classes and pure virtual functions, virtual destructors

8.   File and Streams   (5 hrs)

Components of a file, different operation of the file, communication in files, creation of file streams, stream classes, header files, updating of file, opening and closing a file, file pointers and their manipulations, functions manipulation of file pointers, detecting end-of-file.

LIST OF PRACTICALS

1.   Write a function using variables as arguments to swap the values of a pair of integers

2.   An election is contested by five candidates. The candidates are numberd 1 to 5 & voting is done by marking the candidate number on the ballot paper. Write a program to read the ballot & count the votes cast for each candidate using an array, variable count. In case, a number read is out side the range 1 to 5, the ballot should be considered as a ' spoilt ballot' and the program should also count the number of spoilt ballot.

3.   Write a program to read a matrix of size m*n from the keyboard and display the same on the screen.

4.   Write a macro that obtain the largest of three number.

5.   As the practical 4, using inline function. Test the function using the main program.

6.   Define a class to represent a bank account including the following members:- Data members
        a) Name of the depositors
        b) Account number
        c) Type of account
        4. Balance amount in the account
             Member function
                  -    To assign initial values
                  -    To deposit an amount

- To withdraw an amount after checking the balance
- To display the name and balance.

7. Modify the class and the program of practical 6 for handling 10 customers.

8. Create 2 classes OM and DB which store the value of distance. DM store distances in meters and cm and DB in feet and inches. Write a program that can read values for the class objects and add 1 object OM with another object of DB.   .

Use a friend function to carry out the addition operation the object that stores the results may be a DM object or a DB object, depending upon the units in which the results are require. The display should be in the format of feet and inches or meters and cms depending on the object on display.

9. A book shop maintains the inventory of books that are being sold at the shop the list includes details such as author, title and publisher and stock position. Whenever a customer wants the book, the sales person inputs the title and author and the system search the list and display whether it is available ornot. If it is not, a appropriate message is displayed, if it is, then the system displays the book details and requests for the number of copies require. If the requested are available, the total cost of the required copies is displayed: otherwise the message" Required copies not in stock"is displayed. Design a system using a class called books with suitable member functions and constructors. Use new operator in constructor to allocate memory space require.

10. Define a class string that could work as a userdefined string type include constructors that will enable us to create an .un-initialized string
        String s1; :/ string with length 0
And also to initialize an object with string constant at the time of creation like
        String s2("well done");   .
Include a function that adds two strings to make a third string.

11. Create a class float that contains 2 float data member. Over load all the 4 arithmetic operators so that do operate on the objects of float.

12. Create a class MAT of size m*o. Define all possible matrix operation for MAT type objects

13. Define 2 classes POLAR and RECTANGLE to represent points in the POLAR and RECTANGLE systems. Use conversion routines to convert from one system to the other.

14. Create a base class called shape use this class to store two double type values that could be used to compute the area of fig. Derive the specific class called TRIANGLE and RECTANGLE from the data shape. Add to base class, a member function get - data ( ) to initialize base class data members and another member and another member function display – area( ) to compute and display the area of the fig.. Make display – area ( ) as a virtual function and redefine function in the derived classes to suit their requirements,

Using these 3 classes design a program that will accept dimension of RECTANGLE or TRIANGLE interactivity and display the area.

Remember the 2 values given as input will be treated as length of 2 sides in the case of rectangle and as base and height in the case of triangles and used as follows:

Area of rectangle $= x*y$
Area of triangle $= 1/2 *x*y$

15.   Exercise on file handling

RECOMMENDED BOOKS

1.   C++: An introduction to programming by Jense Liberty Tim Keogh: BPB Publications, New Delhi

2.   OO Programming in C++ by Robert Lafore: , Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi

3.   Object Oriented Programming Using C++, Sanjeev Sofat, Cyber Tech. Publication, New Delhi

4.   Object Oriented Programming in C++ by E. Balaguruswamy, TMH Publishing Co. Ltd., New Delhi

5.   C++ Primier by Stephen Parata , TMH Publishing Co. Ltd., New Delhi

6.   C++ Primer by SB Lippman and J Lajoie; Addison Wesley (Singapore) Pvt. Ltd., New Delhi

7.   Mastering C++ by KR Venugopal and Rajkumar, T Ravishankar; Tata McGraw Hill Publishing Co. Ltd., New Delhi

8.   Object Oriented Data Structuring using C++ by KS Easwarakumar; Vikas Publishing House Pvt. Ltd., New Delhi

9.   Programming in C and C++ by SS Khandare; S Chand and Company Ltd. New Delhi

10.   Object Oriented Programming using C++ by B Chandra, Narosa Publishing House Pvt Ltd., Daryaganj, New Delhi 110002

11.   Object Oriented Programming using C++ by R Rajaram , New age International (P) Ltd, Publishers New Delhi

12.   Programming in C++ by N Dale, C. Weems and Headington, Narosa Publishing House Pvt Ltd., Daryaganj, New Delhi 110002

4.2   WINDOWS AND LINUX OPERATING SYSTEM
(Common with Computer Engineering)

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                                                          2  -  6
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RATIONALE

The knowledge of this subject will enable the students to understand the concepts of Linux and its potential. The students will also get hand on experience of linux after undergoing this course.

DETAILED CONTENTS

Linux Operating System

1.   Introduction   (3 Hrs)
        History of Linux and Unix, Linux Overview, Linux releases, open linux

2.   Linux Commands and Filters   (6 Hrs)
        Mkdir, CD, rmdir, pwd, ls, who, whoami, cat, more, fail, head, concept of, mv, chmod, grep, wc, comm., split, sort, diff, kill, write, wall, merge, mail, news

3.   Shell   (6 Hrs)
        The command line special characters and file arguments, standard input/output and redirection, pipes, redirecting and piping with standard errors, shell scripts, jobs.

4.   Linux file Structure   (6 Hrs)
        Linux files, file structure, listing displaying and printing files, managing directories, file and directory operations.

5.   Vi Editor   (3 Hrs)
        Vi editing commands, advanced Vi editing commands, line editing commands, options in Vi.

6.   System Administration   (6 Hrs)
        System management, managing users, installing and managing devices, floppy disk management, file system administration, backups.

Windows Network Operating System

7.   Introduction   (6 Hrs)
        Windows operating system - its features and capabilities; comparison with OS hardware requirements for Windows 98, 2000 XP, Millennium,NT.

8.   Control Program and Control Panel   (6 hrs)
        Customizing desktop, installing, removing programs, managing your files and folders (creating, renaming, deleting, moving, copying etc.)

LIST OF PRACTICALS

Installing Linux

1. Creating and managing user accounts
2. Practice on Linux commands
3. Practice on vi commands
4. Write and execute at least 10 programmes in Linux using shells such as
   - Factorial of numbers
   - Even/odd numbers
   - Fibonacci series
   - Prime numbers
   - Arrange of numbers
   - Reverse of numbers
   - Lower case to upper case
   - Greatest of three numbers etc.
5. Installing and configuring X-windows
6. Create file and folder
7. Searching a file
8. Installation of device drivers
9. Creating user accounts
10. Customizing desktop
11. Setting monitor resolution

RECOMMENDED BOOKS

1. Linux – The Complete Reference by Richard Peterson, Tata McGraw Hill, New Delhi

2. Linux – Install and Configuration Black Book by Die Annleblanc and Issac Yates, IDG Books India Private Ltd., Delhi

   3. Unleashed Linux by Tech Media Publishers.

4.3   RELATIONAL DATABASE MANAGEMENT SYSTEM (RDBMS)
(Common with Computer Engineering)

L T P
2 - 4

RATIONALE

Database and database systems have become an essential component of everyday life in modern society. This course will acquaint the students with the knowledge of fundamental concepts of DBMS and its application in different areas, storage, manipulation and retrieval of data using query languages.

DETAILED CONTENTS

1.   Introduction   (3 hrs)

    1.1   Database Systems
        -    Database and its purpose
        -    Characteristics of the database approach
        -    Advantages and disadvantages of database systems

    1.2   Classification of DBMS Users
        -    Actors on the scene
        -    Database Administrators, Database Designers, End Users, System Analysts and Application Programmers
        -    Workers behind the scene (DBMS system designers and   implementers, tool developers, operator and maintenance   personnel)

2.   Database System Concepts and Architecture   (6 hrs)

    2.1   Data models, schemas, instances, data base state

    2.2   DBMS Architecture
        -    The External level
        -    The conceptual level
        -    The internal level
        -    Mappings

    2.3   Data Independence
        -    Logical data Independence
        -    Physical data Independence

    2.4   Database Languages and Interfaces
        -    DBMS Language
        -    DBMS Interfaces

    2.5   Classification of Database Management Systems

3.   Data Modeling using E.R. Model (Entity Relationship Model)   (5 hrs)

  3.1   Data Models Classification : File based or primitive models, traditional data models, semantic data models.

  3.2   Entities and Attributes

  3.3   Entity types and Entity sets

  3.4   Key attribute and domain of attributes

  3.5   Relationship among entities

4.   Relational Model: (6 hrs)

  4.1   Relational Model Concepts: Domain, Attributes, Tuples and Relations

  4.2   Relational constraints and relational database schemes
          -       Domain constraints
          -       Key constraints and constraints on Null
          -       Relational databases and relational database schemes
          -       Entity integrity, referential integrity and foreign key

5.   Functional Dependencies and Normalization   (6 hrs)

  5.1   Functional Dependencies
          -       Trivial and Non-trivial dependencies
          -       Closure of a set of dependencies and attributes
          -       Irreducible set of dependencies

  5.2   Normalization
          -       Non-loss decomposition and functional dependencies
          -       First, Second and Third normal forms.
          -       Boyce/Codd normal form

6.   Structured Query Language   (6 hrs)

  Data definition language : Create, Alter, Drop commands
  -       Data Manipulation Language (DML)
  -       Select command with where clause using conditional expressions and Boolean operators, group by clause, like operator.
  -       Insert, Update and Delete commands

LIST OF PRACTICALS

1. Overview, Features and functionality, Application development in MS-Access

2. Exercises on different forms of select statement

3. Exercises on creation of tables, altering of table and dropping of table

4. Exercises on insertion of data into tables

5. Exercises on deletion of data using different conditions

6. Exercises on UPDATE statement

INSTRUCTIONAL STRATEGIES

Explanation of concepts using real time examples, diagrams etc. For practical sessions books along with CDs or learning materials with specified activities are required. Various exercises and small applications should be given along with theoretical explanation of concepts.

RECOMMENDED BOOKS

1) Fundamentals of Database Management Systems by Dr Renu Vig and Ekta Walia, - an ISTE, Publication, New Delhi

2) Database Management Systems by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., New Delhi

3) An introduction to database systems by Date C.J. Adison Wesley

4) Fundamentals of Database Systems by Elmasri/Navathe/Adison Wesley

5) An Introduction to database systems by Bipin C. Desai, Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi 110 002

6) SQL Unleashed by Hans Ladanyi Techmedia Publications, New Delhi

7) Oracle 8, The complete reference by Koch and Loney, Tata McGraw Hill Publications New Delhi

4.4   MULTIMEDIA APPLICATIONS
(Common with Computer Engineering)

L T P
2 - 3

RATIONALE

Multimedia is a new concept emerged in the recent times. Now this technology is being widely used in web pages, motion pictures and interactive presentations, animation etc. Multimedia has made a significant impact in training/education, business presentations, public information access etc. This course intends to introduce and expose multimedia technology and various factors and features of authoring software. It will also help in making the internet application richer in content and presentation

DETAILED CONTENTS

1.   Introduction   (5 hrs)
Introduction to multimedia, hypertext, hypergraphics, animation, application in education and training, science and technology, kiosks, business and games

2.   Multimedia Hardware   (5 hrs)
Multimedia PC configuration, features and specifications of sound and video interfaces, OCR, touch-screen, scanners, digital cameras, speakers, printers, plotters, optical disks and drives as CDROM and DVD. multimedia networks

3.   Multimedia Files   (5 hrs)
Image and sound file formats, multimedia file formats, compression, standards and techniques, features of software to read and write such files.

4.   Photo-shop   (15 hrs)
Photo-shop workshop, image editing tools, specifying and adjusting colors, using gradient tools, selection and move tools, transforming path drawing and editing tools, using channels, layers, filters and actions

5.   Flash   (9 hrs)
Exploring interface, using selection and pen tools, working with drawing and painting tools, applying color, viewing and manipulating time line, time line/stage relationship, animating (frame-by-frame, tweening), guiding layers, importing and editing sound and video clips in flash, working with 3-D graphics

6.   Director   (9 hrs)
Exploring interface: score editor, cast editor, toolbars, library, palette, inspector, menu bar, cast libraries, painting techniques, importing images, working with stage, sprites and score; using text, using sound, using digital video, creating behaviour, using behaviour inspector, basics of lingo

LIST OF PRACTICALS

1.   Configuring multimedia devices to PC (Personal computer)

2.   Installing and use of various multimedia devices
        -       Scanner
        -       Digital camera, web camera
        -       Mike and speakers
        -       Touch screen
        -       Plotter and printers
        -       DVD
        -       Audio CD and Video CD
        -       Reading and writing of different format on a frame CD
        -       Transporting audio and video files
        -       Using various features of Director
        -       Using various features of Flash
        -       Using various features of Photo-shop
        -       Making multimedia presentations combining Director, Flash, Photo-shop, such as department profile, lesson presentation, games and project presentations

INSTRUCTIONAL STRATEGY

As the subject is practice oriented, more stress should be given to students to do the work practically. The features of software packages Photo-shop, Flash and Director are to be demonstrated in class using LCD projector.

RECOMMENDED BOOKS

1.   Multimedia An Introduction by Villam Casanova and Molina; Prentice Hall of India, New Delhi

2.   Multimedia Bible by Win Rosch

3.   Multimedia Making it work by Baughan, Jay

4.   Director and Lingo Bible by John and Nyquist and Rober Martin, IDG Books India Pvt. Ltd.,

5.   Mastering Macro Media Director 5 by Feudnon; BPB Publication, New Delhi

6.   Photo-shop for Windows Bible by Deke Maclelland IDG Books India Pvt. Ltd., New Delhi

7.   Multimedia Technology and Application by Hillman, Galgotia Publications, New Delhi

8.   Flash 5 Bible by Rein Hardit, IDG Books India Pvt. Ltd.

9.   Flash 5 in easy steps by Vandome IDG Books India Pvt. Ltd.

4.5   COMPUTER ORGANISATION
(Common with Computer Engineering)

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3   -   -

RATIONALE

The subject provides the students with the knowledge of detailed organization of currently available personal computers in order to understand their functioning and maintenance. The students will also get familiar with different types of motherboards, architectures and bus standards. The single user system based on 486, Pentium MMX, Pentium-II, Pentium-III and Pentium-IV will get emphasis.

Note: List of practicals has been given only as guide lines for students to learn, not for examination.

DETAILED CONTENTS

1.   Review   (4 hrs)
Salient features and block diagram of 486, Pentium MMX and Pentium-II, Pentium-III and Pentium-IV

2.   Hardware Organization of PC   (10 hrs)
The motherboard of PC; Pentium, CPU, memory organization, keyboard interfacing, inter-facing of audio speakers, serial and parallel ports

3.   Bus Standards and Architectures   (4 hrs)
ISA, EISA, VESA and PCI

2.   Interface Standards   (6 hrs)
RS232, IDE, EIDE, SCSI-II, Fast and wide SCSI, IEEE 488

3.   The Basic Input/Output System   (6 hrs)
What is BIOS? Function of BIOS, software interrupts, testing and initialization, configuring the system

4.   Introduction to RISC Processors   (8 hrs)
What is RISC technology? Different RISC processors available

5.   Bus Architecture and Mini Computers   (6 hrs)
VME and Multi bus

6.   Architecture of multiprocessor system   (4 hrs)

LIST OF PRACTICALS

1.   To identify various components, devices and sections of computer.

2.	To Study of motherboards

3.	To interconnect the system unit with the video monitor, mouse and key board and test the operation of the computer.

4.	Identification of chipsets and functional aspects of different subsystems on each card

5.	To connect various add on cards and I/O devices to a computer motherboard and test their working

6.	Study of the bus system and identifying various signal lines

7.	To note the voltages and waveforms at various terminals in the I/O channel (Bus Slots)

8.	Study of peripherals used, their speeds and capacities

Note: List of practicals has been given only as guide lines for students to learn, not for examination.

INSTRUCTIONAL STRATEGY

Since this subject is theoretical one, the practical aspects should be taught along with the theory instruction. The students be given quiz tests and asked to give seminars on small topics. List of practicals has been given only as guide lines not for examination. There is sufficient time in this subject students may be taken to laboratory for demonstration.

RECOMMENDED BOOKS

1.	Computer Architecture by Rafiquzzaman, M; Prentice Hall of India, New Delhi.

2.	Fairhead – 80386/80486 BPB Publication, New Delhi

3.	Hardware and Software of Personal Computers by Bose, SK; Willey Eastern Ltd., New Delhi

4.	Structured Computer Organisation by Tanenbaum, Andrew S.; Prentice Hall of India, New Delhi.

5.	Upgrading and Preparing PCs by Scott Muller, Techmedia Publications

6.	Computer Organisation and Architecture by Linda Labur, Narosa Publishing House Pvt. Ltd. Darya Ganj, New Delhi

4.6   MANAGEMENT INFORMATION SYSTEM (MIS)

L   T   P
-    -   3

RATIONALE

Content management is essential in the fast changing Internet world. The course will enable the students to acquire, store, compress and transmit multimedia information and apply to various IT enabled services including call centers and web helpdesks.

Note: The detailed contents given below are the guidelines for the teacher for teaching practically.

DETAILED CONTENTS

1.   Introduction : Concept of data, information, content; need of information management and transmission

2.   Data and Information acquisition, storage and retrieval: Internal representation of numeric and character data; acquisition of graphical data, audio data, moving image data (video), data storage and retrieval on secondary memory including floppies and CDROM, multimedia file formats; compression tools and techniques

3.   Using Internet Applications: Using email on Windows (Outlook Express) and Linux platforms (pine); information retrieval from World Wide Web; audio, graphics, animation and video on the Internet

4.   e-books and e-journals: creating, uploading and downloading; issues, efficiency considerations; creating and viewing PDF and PS files

5.   Applications used in IT enabled services: Electronic conferencing, call centers, electronic commerce, telemedicine, web help desk, data centers, medical transcription, e-library – introduction, uses, methods, content management and transmission techniques involved in the above applications.

6.   Introduction to intellectual property rights; careers in information technology

LIST OF PRACTICALS

1.   Acquisition, storage and retrieval of multimedia data using scanners, digital cameras and other input devices

2.   Sending and reading e-mail using Outlook Express

3.   Creation of CD for reading and writing

4.   Creating uploading and downloading of e-journals

5.   Compression and extraction of above multimedia information

6.   Transmission and receiving multimedia information using e-mail

7.   Creating and viewing PDF and PS files

8.   Exposure to IT enabled services like telemedicine in PGI, call centres and medical transcription centres

RECOMMENDED BOOKS

1.   Introduction to Information Technology by V Rajaraman, PHI 2000 (Chapters 1-6, 15, 17-18)

2.   Management Information Systems by Robert Schulthess and Mary Summer, Tata McGraw Hill Publishers, New Delhi, 2000 (Chapter 9)

3.   Design of Information Systyem- A Modern approach, by J. Mishra, A Mohanty, Narosa Publishing House Pvt. Ltd, Daryaganj, New Delhi 110002

ENTREPRENEURIAL AWARENESS CAMP

This is to be organized at a stretch for two to three days during second year. Lectures will be delivered on the following broad topics. There will be no examination for this subject

1. Who is an entrepreneur?

2. Need for entrepreneurship, entrepreneurial career and wage employment

3. Scenario of development of small scale industries in India

4. Entrepreneurial history in India, Indian values and entrepreneurship

5. Assistance from District Industries Centres, Commercial Banks. State Financial Corporations, Small industries Service Institutes, Research and Development Laboratories and other financial and development corporations

6. Considerations for product selection

7. Opportunities for business, service and industrial ventures

8. Learning from Indian experiences in entrepreneurship (Interaction with successful entrepreneurs)

9. Legal aspects of small business

10. Managerial aspects of small business